

UNDERSTANDING LOW ENERGY REACTIONS WITH EXOTIC NUCLEI *

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Light nuclei on the driplines can be studied through a variety of reactions. Models for nuclear reactions have been developed in recent years in order to incorporate the exotic features of these dripline nuclei. The real challenge for reaction theory lies in the low energy regime where most approximations are not valid [1].

Three body effects need to be carefully considered in the lower energy regime. At energies close to the breakup threshold, Integral Faddeev Equations would be the appropriate choice. However, due to technical problems the Continuum Discretized Coupled Channel Method (CDCC) [2] is the best working alternative.

The proximity to the breakup threshold has been shown to have important effects in the reaction mechanism [3]. Continuum couplings are a way of looking into the effect of the final state interaction, integral part of CDCC. We will discuss the properties of these couplings and the influence they can have on breakup observables [4].

Historically, there has always been the underlying assumption that, by appropriately choosing the experimental conditions, Coulomb effects can be isolated from nuclear effects. Especially when breakup reactions are used to extract Astrophysical information, such as radiative capture rates, this separation is crucial [5]. We discuss the influence of nuclear breakup in some cases of relevance to Astrophysics [6].

A variety of breakup models are presently in use and, when two different models are applied to the same problem, there is often a disparity in the predictions. In this sense, a generalized effort to bridge the various approaches is very much needed. One of the important issues lies in the choice of the coordinate representation of the continuum wavefunctions. We present results of a comparative study between the standard CDCC breakup approach and the so called transfer to the continuum [7].

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